CLAIMS

What is claimed is:

1. An exhaust emission control method comprising:

passing exhaust through a particulate filter from an upstream side thereof to a downstream side thereof to trap exhaust particulate in said particulate filter;

after passage through said particulate filter, passing said exhaust along a catalyst downstream of said particulate filter;

regenerating said particulate filter by combusting said trapped particulate, and producing a combustion product from said combustion of said trapped particulate;

using said combustion product to assist regeneration of said downstream catalyst.

2. The exhaust emission control method according to claim 1 comprising providing said downstream catalyst in sufficiently close proximity to said particulate filter to carry out a thermodynamically favorable reaction with said combustion product.

3. The exhaust emission control method according to claim 2 comprising passing said exhaust axially along an axial flow path comprising a flow channel having a wall-flow channel providing said particulate filter and having a flow-through channel axially aligned with said wall-flow channel in said flow channel and providing said downstream catalyst.

4. The exhaust emission control method according to claim 3 comprising providing said downstream catalyst in sufficiently close proximity to said particulate filter by axially overlapping sections of said wall-flow channel and said flow-through channel.

5. The exhaust emission control method according to claim 1 wherein said exhaust is diesel engine exhaust, and said particulate filter is a diesel particulate filter trapping diesel exhaust particulate, including soot.

6. The exhaust emission control method according to claim 5 wherein said downstream catalyst is an NO_X adsorber.

7. The exhaust emission control method according to claim 6 wherein said NO_X adsorber comprises an NO_X storage element and an NO_X catalyst.

8. The exhaust emission control method according to claim 7 wherein said NO_X storage element is selected from the group selected consisting of alkali and alkaline earth compounds.

9. The exhaust emission control method according to claim 8 wherein said compound is selected from the group consisting of oxide, carbonate and nitrate.

10. The exhaust emission control method according to claim 9 wherein said NO_X storage element is selected from the group consisting of Ba, Li, Na, K and Ca.

11. The exhaust emission control method according to claim 7 wherein said NO_X catalyst is a precious metal catalyst.

12. The exhaust emission control method according to claim 6 wherein said combustion product is CO, and comprising providing said downstream NO_X adsorber in sufficiently close proximity to said diesel particulate filter to carry

out said thermodynamically favorable reaction with said CO, and regenerating said downstream NO_X adsorber with said CO derived from said diesel particulate filter in said sufficiently close proximity thereto.

13. The exhaust emission control method according to claim 12 wherein said reaction includes $NO + CO \rightarrow 1/2N_2 + CO_2$.

14. The exhaust emission control method according to claim 13 comprising oxidizing soot in said diesel particulate filter, providing said downstream NO_X adsorber in sufficiently close proximity to said diesel particulate filter to further carry out the reaction according to said $NO + CO \rightarrow 1/2N_2 + CO_2$.

15. The exhaust emission control method according to claim 14 comprising also generating CO_2 from said CO according to $O_2 + CO \rightarrow CO_2$.

16. A method of reducing wasteful loss of CO to oxidation in an exhaust emission control regeneration method for diesel engine exhaust wherein said exhaust is passed through a diesel particulate filter from an upstream side thereof to a downstream side thereof to trap diesel exhaust particulate, including soot, in said diesel particulate filter, and wherein said diesel particulate filter is regenerated by combusting said soot to produce CO, said method comprising providing an NO_X adsorber downstream of said diesel particulate filter, and enhancing the chances of said CO helping regeneration of said downstream NO_X adsorber by locating said downstream NO_X adsorber in sufficiently close proximity to said diesel particulate filter.

17. The method according to claim 16 comprising passing said exhaust axially along an axial flow path comprising a flow channel having a wall-flow channel providing said diesel particulate filter and having a flow-through

channel providing said downstream NO_X adsorber, and comprising enhancing said chances by axially aligning said flow-through channel and said wall-flow channel along said axial flow path.

18. The method according to claim 17 comprising concomitantly providing both said sufficiently close proximity and said axial alignment by axially overlapping sections of said wall-flow channel and flow-through channel.

19. An exhaust emission control regeneration method for diesel engine exhaust, said method comprising regenerating a diesel particulate filter having trapped diesel exhaust particulate, including soot, by combusting said trapped particulate and producing a combustion product from said combustion of said trapped particulate, and using said combustion product to regenerate a catalyst downstream of said diesel particulate filter.

20. The exhaust emission control regeneration method according to claim 19 wherein said combustion product is CO, and said catalyst is an NO_X adsorber downstream of said diesel particulate filter, and comprising regenerating said downstream NO_X adsorber with said CO.

21. The exhaust emission control regeneration method according to claim 20 wherein said downstream NO_X adsorber is in sufficiently close proximity to said diesel particulate filter to carry out a thermodynamically favorable reaction with said CO.

22. An exhaust emission control method for a diesel engine exhaust system having a diesel particulate filter trapping diesel particulate, including soot, and an NO_X storage element downstream of said diesel particulate filter and storing NO_X, said method comprising regenerating said diesel particulate filter by combusting said

soot to produce CO, and reacting said CO with said stored NO_X to release the latter.

23. An exhaust emission control method for a diesel engine exhaust system having a diesel particulate filter trapping diesel particulate, including soot, and an NO_X adsorber downstream of said diesel particulate filter, said method comprising regenerating said diesel particulate filter by combusting said soot to produce CO, oxidizing said CO to generate heat, and using said heat to regenerate said downstream NO_X adsorber.

24. The exhaust emission control method according to claim 23 comprising oxidizing said CO with a catalyst.

25. The exhaust emission control method according to claim 24 wherein said catalyst is a precious metal catalyst.

26. An emission control system for diesel engine exhaust comprising a diesel particulate filter passing said exhaust therethrough from an upstream end to a downstream end and trapping diesel exhaust particulate, including soot, at least one of said ends being coated with a catalyst facilitating heat generation and soot combustion to regenerate said diesel particulate filter.

27. The emission control system according to claim 26 wherein said catalyst is selected to facilitate oxidation and combustion of said soot.

28. The emission control system according to claim 27 wherein said catalyst is a precious metal catalyst.

29. The emission control system according to claim 26 wherein each of said upstream and downstream ends is coated with a catalyst facilitating heat

generation and soot combustion to regenerate said diesel particulate filter at each of said ends.